

REMARKS

A. Background

Claims 1-19 were pending in the application at the time of the Office Action. Claim 7 was rejected as being indefinite. Claims 1-7, 9, 10, and 14-19 were rejected as being anticipated by cited art. Claims 8 and 11-13 were rejected as being obvious over cited art. Claims 20-49 were canceled in earlier papers. By this response Applicant has canceled claims 11, 13 and 17-19, amended claims 1-3, 5-7 and 12, and added claims 50-54. As such, claims 1-10, 12, 14-16 and 50-54 are presented for the Examiner's consideration in light of the following remarks.

B. Proposed Amendments

By this response, Applicant has amended independent claim 1 to incorporate the limitations of claims 11 and 13. Claim 13 previously depended from claim 11 which previously depended from claim 1. Similarly, Applicant has amended independent claims 2, 3, 5 and 6 to also incorporate the limitations of claims 11 and 13. Support for these amendments may be found at least at prior claims 11 and 13.

Applicant has also added new claims 50-54 which depend, respectively, from claims 1-3, 5 and 6. The new claims are supported in the specification at least at page 27, lines 21-25.

In view of the foregoing, Applicant respectfully submits that the amendments to the claims do not introduce new matter and entry thereof is respectfully requested.

C. Rejection on the Merits

1. Indefiniteness Rejection

Page 2 of the Office Action rejects claim 7 under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. In view of amendments made herein to the claims, Applicant respectfully submits that the rejection has been overcome and should be withdrawn.

2. Anticipation Rejection

Pages 2-6 of the Office Action reject claims 1-7, 9, 10 and 14-19 under 35 U.S.C. 102(b) as being anticipated by U.S. Patent No. 6,501,776 to Numai (“*Numai*”). As to claims 17-19, those claims have been cancelled herein, thus rendering the rejection moot regarding claims 17-19. Regarding claims 1-7, 9, 10 and 14-16, Applicant has amended independent claims 1-3, 5 and 6 herein to each incorporate the limitations of prior claims 11 and 13, as noted above. As discussed below in relation to the obviousness rejections of claims 11 and 13, the Office Action has conceded that *Numai* does not disclose all the limitations of claims 11 and 13. Because those limitations are now included in amended independent claims 1-3, 5 and 6, Applicant submits that claims 1-3, 5 and 6, as well as corresponding dependent claims 4, 7, 9, 10 and 14-16 are not anticipated by *Numai*. Accordingly, Applicant respectfully requests that the anticipation rejection with respect to claims 1-7, 9, 10 and 14-16 be withdrawn.

3. Obviousness Rejections

Applicant respectfully notes at the outset that in order to establish a *prima facie* case of obviousness, it is the burden of the Examiner to demonstrate that three criteria are met: first, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine

reference teachings; second, there must be a reasonable expectation of success; and third, the prior art reference (or references when combined) must teach or suggest all the claim limitations. *MPEP* § 2143

Pages 7-9 of the Office Action rejects claims 8, 11 and 12 under 35 U.S.C. 103(a) as being unpatentable over *Numai* in view of various references, including U.S. Patent No. 4,583,227 to Kirkby (“*Kirkby*”) (claim 8), U.S. Patent No. 6,580,740 to Funabashi et al. (“*Funabashi*”) (claims 11 and 12), and U.S. Patent No. 5,719,974 to Kashyap (“*Kashyap*”) (claim 12). Applicant respectfully traverses these rejections.

Claims 8, 11 and 12 depend from claim 1 and thus incorporate the limitations contained therein. As such, claims 8, 11 and 12 each require, among other things, the limitations of prior claims 11 and 13, which have been added to claim 1. However, as noted above, the Office Action has conceded that *Numai* does not teach the aforementioned limitations of claim 1. Furthermore, Applicant submits that none of the other cited art, alone or in combination, teaches the added limitations of claim 1. That is, none of the cited art cures the deficiencies of *Numai* with respect to claim 1, as discussed above. As such, applicant submits that claims 8, 11 and 12 are distinguished over the cited art for at least the same reasons as discussed above with regard to claim 1. In view of the foregoing, Applicant submits that claims 8, 11 and 12 are not obvious over the cited art. Accordingly, Applicant respectfully requests that the obviousness rejections of claims 8, 11 and 12 be withdrawn.

Pages 9 and 10 of the Office Action reject claim 13 under 35 U.S.C. 103(a) as being unpatentable over the allegedly obvious combination of *Numai* and *Funabashi* and further in view of U.S. Patent No. 5,155,737 to Ikeda et al. (“*Ikeda*”). Inasmuch as claim 13 has been canceled herein, the rejection of claim 13 has been rendered moot. Applicant has herein

incorporated the limitations of claim 13 into all of the pending independent claims, as noted above. Applicant submits that the pending independent claims 1-3, 5 and 6, and corresponding dependent claims are not obvious over the allegedly obvious combination of cited art. Specifically, Applicant respectfully submits that it would not be obvious to combine *Numai* or *Funabashi* or any combination thereof with *Ikeda*, contrary to the assertion in the Office Action.

The Office Action concedes that neither *Numai* nor *Funabashi* teach “the coupling coefficient of the diffraction grating of the gain region being greater than 300 cm⁻¹,” and points to *Ikeda* to remedy this deficiency.

Ikeda is directed toward a “semiconductor wavelength conversion device.” See col. 2, lines 25-32. In *Ikeda* an external input light “is used as an input signal light and [a] wavelength conversion is performed [on the input light such that] … an output light … outgoes perpendicularly polarized to the input light.” Col. 3, line 64 – col. 4, line 2. That is, the wavelength conversion is performed on the externally inputted light. As such, the external light source is required in *Ikeda*; without an externally inputted light, no wavelength conversion will take place. *Ikeda* further teaches a corrugation grating having a high coupling coefficient to prevent light from returning to the input side. See col. 6, lines 61-64. The only reason given for having the high coupling coefficient in *Ikeda* is to prevent light from returning to the input light side.

In contrast, *Numai* and *Funabashi* are directed to “semiconductor lasers” that do not appear to require an external light source. Furthermore, neither *Numai* nor *Funabashi* appears to disclose any light being inputted into the respective devices.

Because the only reason given in *Ikeda* for having the high coupling coefficient is to prevent light from returning to the externally inputted light side, and because neither *Numai* nor

Funabashi disclose using an external light, Applicant submits that there is no reason one of ordinary skill would be motivated to combine the teachings of *Numai* and *Funabashi* with *Ikeda*. That is, neither of the *Numai* nor *Funabashi* lasers has any reason to prevent light from returning to an input side through which light is externally inputted because neither of the references has an inputted light. And because the aforementioned light prevention is the only reason given for having a higher coupling coefficient, there is no motivation for one to modify *Numai* and/or *Funabashi* to have a higher coupling coefficient based on the teachings of *Ikeda* in the manner set forth in the Office Action.

In view of the foregoing, Applicant submits that the Office Action has failed to establish a *prima facie* case of obviousness because the Examiner has failed to establish a suggestion or motivation to combine reference teachings. Accordingly, Applicant respectfully submits that none of the pending claims is made obvious by the allegedly obvious combination of *Numai*, *Funabashi*, and *Ikeda*.

No other objections or rejections were set forth in the Office Action.

D. New Claims

Applicant submits that new claims 50-54 are distinguished over the cited art of record. For example, each of claims 50-54 recites that “the stop bandwidth of the diffraction grating of said gain region is increased by setting the coupling coefficient of the diffraction grating of said gain region at least at 300 cm⁻¹. ” None of the cited art teaches this limitation.

Furthermore, claims 50-54 respectively depend from independent claims 1-3, 5 and 6 and are thus further distinguished over the cited art for at least the same reasons discussed above regarding claims 1-3, 5 and 6.

E. Error in Published Title

Applicant notes that in the published application for the current application (publication 2006/0050752), the patent office has introduced an error into the title of the invention. Specifically, the title, which was filed by Applicant as “OPTICAL SEMICONDUCTOR DEVICE AND OPTICAL SEMICONDUCTOR INTEGRATED CIRCUIT” has erroneously been changed to “OPTICAL SEMICONDUCTOR DEVICE AND OPTICAL SEMICONDUCTOR IN TEGRATED CIRCUIT” (i.e., a space has been added between “IN” and “TEGRATED”). Applicant respectfully requests that this patent office error be rectified.

F. Conclusion

Applicant notes that this response does not discuss every reason why the claims of the present application are distinguished over the cited art. Most notably, applicant submits that many if not all of the dependent claims are independently distinguishable over the cited art. Applicant has merely submitted those arguments which it considers sufficient to clearly distinguish the claims over the cited art.

In view of the foregoing, applicant respectfully requests the Examiner’s reconsideration and allowance of claims 1-10, 12, 14-16 and 50-54 as amended and presented herein.

In the event there remains any impediment to allowance of the claims which could be clarified in a telephonic interview, the Examiner is respectfully requested to initiate such an interview with the undersigned.

Dated this 19th day of April 2007.

Respectfully submitted,

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